PRECISION VOLTAGE REFERENCE

MODEL PVR-1A/1AR

SERIAL SP-213

Rcvd 17 Mar. 65

CALIBRATION STANDARDS CORPORATION

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SECTION I

INTRODUCTION

1.1 Calibration Standards Corporation's Model PVR-1A/1AR, Precision Voltage Reference, is an extremely stable and accurate laboratory standard voltage source.

1.2 The PVR-1A/1AR furnishes both a fixed voltage of 1.00000 vdc and a voltage variable from 1.01000 to 1.02000 vdc.

1.3 Its principle uses include: as a standard voltage for a comparator, as a calibrator and as a voltage reference for laboratory potentiometers and Kelvin-Varley dividers.

1.4 Since the basic reference of the instrument is an ultra-stable, aged, temperature compensated zener diode, the Model PVR-1A/1AR is ready for immediate use following exposure to wide variations in temperature or a high degree of shock or vibration.

1.5 Excellent long-term stability and accuracy is achieved by the utilization of low temperature coefficient, precision wirewound resistors in all critical circuits.

1.6 All silicon solid state devices are employed throughout the instrument.

1.7 The circuit design is such that the output can be shorted for long periods of time without loss of accuracy or damage to the instrument.

1.8 Because of its small size, 8" x 7" x 6"; light weight, under 6 pounds; and low power consumption, 2 watts; the PVR-1A is ideally suited as a portable calibrator.

SECTION II

SPECIFICATIONS

2.1	Output Voltage Range	1.00000 vdc fixed 1.01000 to 1.02000 variable
2.2	Accuracy	±0.005% at 25°C
2.3	Dialout	6 digits
2.4	Output Impedance	5000Ω/volt
2.5	Stability	±.002% (20 ppm)/month ±.004% (40 ppm)/year ±.0005% (5 ppm)/°C from +10°C to +40°C
2.6	Dialout Linearity	±.002%
2.7	Line Regulation	±.001% (10 ppm) for ±10% line change
2.8	Input Voltage	117 vac, 50-60 cps
2.9	Input Power	2 watts
2.10	Size	8"w x 7"h x 6"d
2.11	Weight	6 pounds

SECTION III

OPERATING INSTRUCTIONS

3.1 Unless requested otherwise, this instrument is supplied wired for 117 vac, 50-60 cycle operation.

3.2 Turn the POWER switch to ON and allow 30 minutes for warmup.

3.3 If output of 1.0000 volt is desired, connect leads as follows.

3.3.1 Positive to red "1.0000v" terminal.

3.3.2 Negative to black "com" terminal.

3.3.3 The "GND" terminal is connected to the instrument chassis and may be used to bond the PVR to external instrumentation.

3.4 If output of between 1.01000 to 1.02000 volts is desired, connect leads as follows.

3.4.1 Positive to red "POS" variable output terminal.

3.4.2 Negative to black "com" variable output terminal.

3.4.3 The "GND" terminal is connected to the instrument chassis and may be used to bond the PVR to external instrumentation.

3.4.4 Set the variable READOUT knob to the desired last three digits to obtain the indicated output voltage.

3.4.5 Note 1.02000 volts is set as 1.011000

SECTION IV

CIRCUIT DESCRIPTION

4.1 A dc voltage of approximately 47 volts is supplied by transformer T1, the half wave rectifier D1, and filter capacitors and resistors C1A&B and R1 and R2.

4.2 The unregulated DC supplies a two stage transistorized regulator consisting of Q1 and Q2 with their biasing resistors and diodes.

4.3 The reference for Q2 consists of four low temperature coefficient zener diodes D2 through D5. The current through these diodes is provided by R1 and R6. R5, a negative temperature coefficient resistor, compensates for the positive coefficient of the circuit.

4.4 The preregulator provides a source current through R7, a carefully selected wirewound resistor for the primary reference diode D6. D6 is a proprietary Calibration Standards Corporation package specifically developed for its application. It is carefully processed and selected for low noise, long term stability, and temperature coefficient prior to incorporation in the instrument.

4.5 Wirewound resistors R9 through R16 divide the zener voltage, approximately 6 volts, of D6 to provide the fixed and variable reference outputs.

SECTION V

CALIBRATION

5.1 The following equipment or its equivalent is recommended.

5.1.1 Julie Research Laboratories Saturated Cell Bank, Model SCO-106.

5.1.2 Hewlett-Packard Null Detector, Model 425A

5.2 Connect the variable output terminals of the PVR-1A/1AR in series with 5.1.1 and 5.1.2. Observe correct polarity.

5.3 Set the READOUT dial of the PVR to the accurately known value of 5.1.1.

5.4 Adjust variable resistors R9 and R10, coarse and fine adjustments, until a balance is indicated on 5.1.2.

WARRANTY

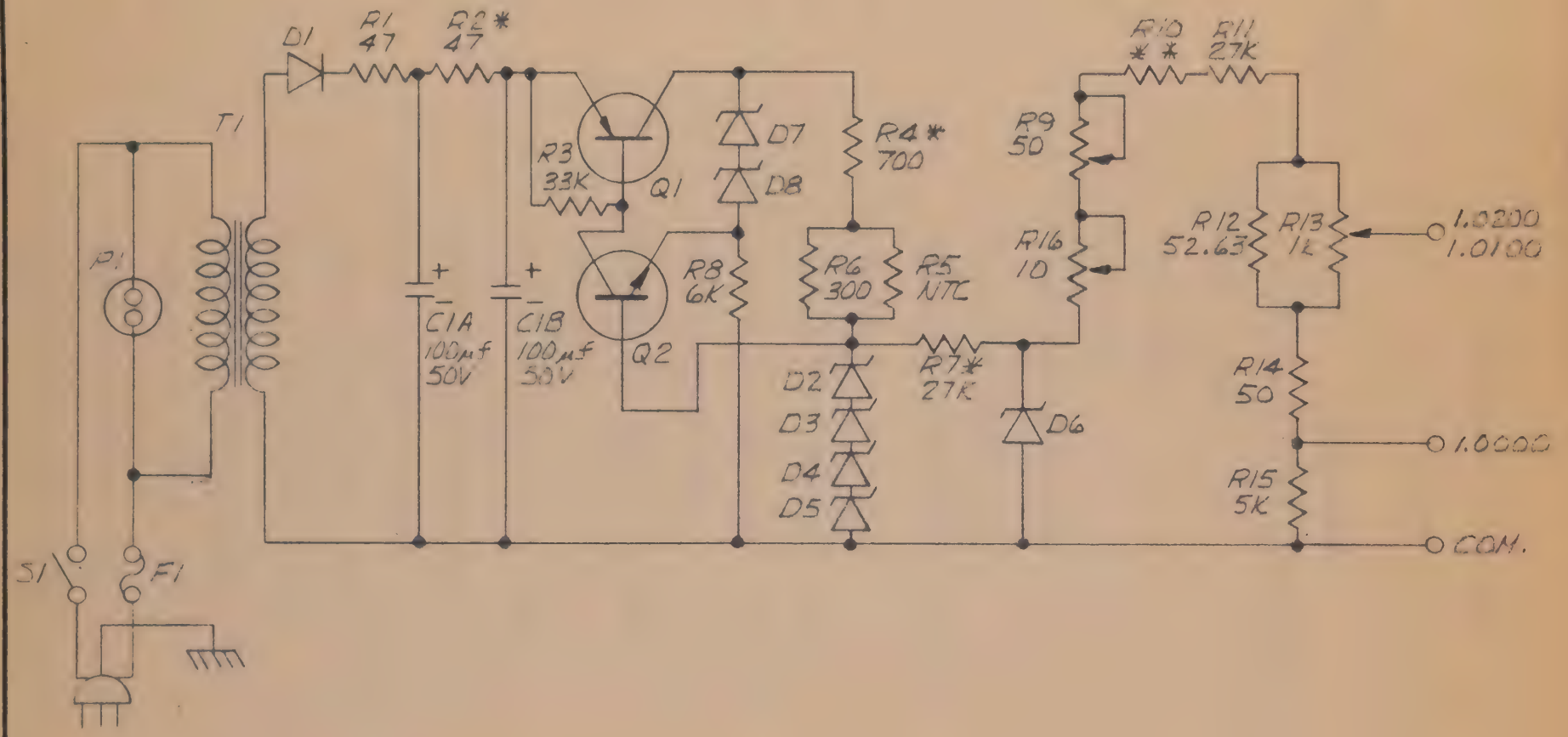
The CALIBRATION STANDARDS CORPORATION warrants each instrument to be free from defects in material and workmanship. The instrument must be returned to the factory with shipping prepaid and a complete report of the difficulty. This warranty is good for one year from the shipping date.

SHIPPING DAMAGE

If there is any damage to the instrument upon receipt, report this to the transportation claim agent immediately.

DRAWING NO.	SYM
340-099	C

SYM	DESCRIPTION	DATE	BY	APP'D
C	REVISED & REDRAWN WAS 526-017	11-27-64	CAS	



3. ALL RESISTORS ARE IN OHMS
2. ** NOT USED IN ALL INSTRUMENTS
1. * APPROX VALUE ; SELECTED IN TEST

NOTES:

TOL.	DATE 11/27/64
	DWN CAS
	CHKD CAB 11-6
	APP'D
	SCALE

CALIBRATION STANDARDS CORPORATION
ALHAMBRA — CALIFORNIA

TITLE: SCHEMATIC - PVR-1A

NEXT ASSY
USED ON 456-053

DRAWING NO. 340-099

SYM C

REPLACEMENT PARTS LIST

PVR-1A/1AR

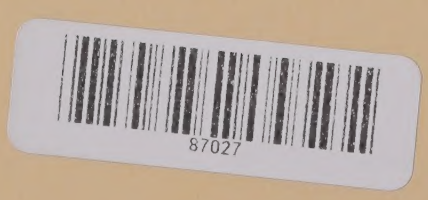
Reference or Quantity	Description	Stock Number
T1	Transformer, 110 vac, 50-60 cycle	235-002
D1	Diode, rectifier	216-025
D2,3,4,5,7,8	Zener diode	216-004
D6	Zener diode	216-001
Q1	Transistor, silicon, PNP	215-036
Q2	Transistor, silicon, NPN	215-015
R1	Resistor, FC, 47Ω, ±10%, 1/2W	201-470
R2	Resistor, FC	*
R3	Resistor, FC, 3.3K, ±10%, 1/2W	201-332
R4	Resistor, DC, 700Ω, ±1%, 1/2W	205-032
R5	Resistor, NTC, 400Ω	209-001
R6	Resistor, DC, 300Ω, ±1%, 1/2W	205-021
R7	Resistor, WW	*
R8	Resistor, DC, 6KΩ, ±1%, 1/2W	205-042
R9	Resistor, WW, variable, 50Ω	210-002
R10	Resistor, WW	**
R11	Resistor, WW, 27KΩ, ±.1%	203-619
R12	Resistor, WW, 52.63Ω, ±.05%	203-622
R13	Resistor, WW, variable, 1KΩ, +3%-0	210-102
R14	Resistor, WW, 50Ω, ±.05%	203-621
R15	Resistor, WW, 5KΩ, ±.01%	203-620
R16	Resistor, WW, variable, 10Ω	210-001

REPLACEMENT PARTS LIST

PVR-1A/1AR

Reference or Quantity	Description	Stock Number
C1A, B	Capacitor, dual, electrolytic, 100mf @ 50v	222-013
S1	Switch, toggle, SPST	240-025
P1	Lamp, neon	262-001
F1	Fuse, 3AG, 1/8 amp	261-001
3	Terminal post, black	263-106
2	Terminal post, red	263-105
1	Knob, 10 turn	214-004
1	Line cord	264-001

*	Value selected in test
**	Value selected in test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